B. Jeannie Fry
Director-
Federal Regulatory

SBC Communications Inc.
1401 I Street, N.W.
Suite 1100
Washington, D.C. 20005
Phone 202 326-8894
Fax 202 408-4806

cc Docket 96-

February 23, 1998

Mr. Chuck Needy
Assistant Division Chief-Economics
Accounting and Audits Division
Federal Communications Commission
2000 L St., N.W.
Room 812
Washington, D.C. 20005

Dear Mr. Needy:

Your letter of February 12, 1998, requested further explanation concerning SBC Communications Inc. (SBC) jurisdictional separations adjustments for Internet usage, as provided to Mr. Ken Moran in my letter of January 20, 1998.

Attached is SBC's response to these questions. This is a preliminary response to each of your questions and, to the extent that you need additional significant information, SBC can supplement these responses at a later date.

As noted in the response to the questions, a complete analysis of the issues would be facilitated by also involving the CLECs, the other LECs and the ISPs. In addition, we ask that the FCC refer this matter to the Joint Board (which is currently examining Separations reform measures) in order that the state interests are also considered. Under the auspices of the Joint Board, all interested parties could be brought together to address and provide empirical data (usage measurements, etc.) in order to capture all internet usage. SBC would willingly participate in such a forum or assist in a further analysis or discussion of this issue.

We look forward to a continuing dialogue with you on this matter. Questions may be referred to me at 202-326-8894 or Paul Cooper at 314-235-8111.

Sincerely,

BJFry

Attachments

(bjfry.fcc.dockets.separ.neadyreply.doc)

Question 1. What is the effect of this reclassification of internet traffic on the separation of 1997 costs for Southwestern Bell Telephone Company (SWBT), Pacific Bell, and Nevada Bell?

Response: Attachment 1 displays the effect on 1997 usage studies and annual revenue requirements of SBC's initial identification of Internet usage as interstate. These effects are small because the full measurement capabilities required to identify all Internet usage are, as yet, unavailable.

For some time, SBC has been concerned that Internet Server Provider (ISP) Internet usage has been improperly assigned to the intrastate jurisdiction because (like FGA) the FCC has allowed ISPs to connect to the network via a line side connection and at a local business rate. As a result, ISP customers are able to originate seven-digit dialed calls to reach the Internet and thus the measured switch usage for this interstate traffic appears to be local. Because the FCC has asserted jurisdictional rate making authority over ISP Internet usage and, consequently, the costs and usage in its access charge orders, and because of the mixed use nature of the traffic, the usage should (similar to FGA) be identified and assigned to the proper jurisdiction - interstate.

As of a result of these circumstances and due to SBC's recognition that substantial growth in Internet usage has occurred over the last few years, (and is still occurring), we began some time ago to investigate methods to identify Internet usage in order to be able to properly assign that usage to the interstate jurisdiction. Briefly, the capabilities that SBC has been investigating are:

1. SS7 signaling link-based recording of trunk usage for traffic destined for telephone numbers identified as the ISP point of presence for the ISP Internet customers.

2. Switch-based recording of usage destined for telephone numbers identified as the ISP point of presence for ISP Internet customers.

3. Studies based on statistically valid samples taken using SS7 signaling link or switch based recordings.

Proper identification of the telephone numbers which the ISP's customers dial to access the Internet over the Public Switched Telephone Network (PSTN) is important to any measurement process. Implementation of these capabilities should, when updated and tested, allow SBC to properly identify all ISP Internet usage and thus properly assign this usage and its related costs to interstate. There may be additional methods SBC has not yet identified (if ISPs were part of the

identification process, other means to identify this usage, would, no doubt, come to light) and SBC would be happy to work with the FCC, ISPs and others on this usage identification effort.

In the interim, until full identification capabilities are developed and deployed, SBC felt that it should, in good faith, as it was able to identify any Internet usage, properly assign that usage and costs jurisdictionally to interstate and to reduce intrastate cost and usage. We began that initial identification with ISP Internet customer usage originated and transported by SBC facilities to Competitive Local Exchange Carriers (CLECs). We did so because the total originating usage, including Internet, was readily identifiable (due to the interconnection agreements) and because we had (as discussed further in response to Question 3) developed a method relying on those measurements to identify ISP Internet usage. We also opted to let the FCC know about the successful results of our initial efforts to properly classify ISP Internet usage that we had been able to identify and, consequently, we sent our letter to Mr. Ken Moran on January 20, 1998.

Question 2. What percent of 1997 traffic is identified as Internet usage by SWBT, Pacific Bell, and Nevada Bell? Specifically, what is the effect of the reclassification on their 1997 measurements of local switching DEM, tandem switching MOU, exchange trunk MOU, interexchange trunk MOU-kilometers, and any other affected jurisdictional allocation factor?

Response: This information is contained in Attachment 1.

Question 3. How did SBC identify the 1997 Internet traffic volumes? If that identification was accomplished using "switch measurement capabilities", as your letter seems to suggest, how were the switches able to distinguish Internet traffic from other types of switched traffic? To what extent does such switch measurement capability differ among SWBT, Pacific Bell, and Nevada Bell? If identification instead was based on special studies, how were those studies performed? To what extent does this identification process differ among SWBT, Pacific Bell, and Nevada Bell?

Response: As discussed in our response to Question 1, we have been evaluating methods to identify all ISP Internet usage. Until these processes are fully implemented, switch measurements in conjunction with additional methods are being utilized to identify, where possible, ISP Internet usage. As also discussed in response to Question 1, we have been able to identify a portion of ISP Internet usage in 1997. Using recordings of seven-digit dialed originating traffic on our network which is originated and transported using SBC facilities to CLECs for transport to ISPs who will further transport the usage onto or beyond the Internet, SWBT performs monthly analyses to identify ISP Internet usage. These procedures are utilized in order to isolate individual telephone numbers with abnormal usage characteristics such as long holding times (associated with ISP Internet usage). Any numbers identified in this manner are then investigated and reports of the associated usage are compiled and used in reciprocal compensation and in the Jurisdictional Separations processes. This same procedure is applicable to California and Nevada. In the near future, when we begin to exchange this type of measured usage information with other LECs, we will implement this same procedure to identify further any ISP Internet usage originated by SBC and transported to those LECs.

Question 4. If SBC's Internet measurement capabilities were only partially deployed when 1997 Internet traffic was measured, can SBC estimate what portion of that Internet traffic was unmeasured? If so, what are the estimated unmeasured portions for SWBT, Pacific Bell, and Nevada Bell? How are those estimates obtained? Are they based, for example, on the relative number of local switches lacking such measurement capabilities?

Response: Currently, SBC does not have an estimate of total amount of Internet usage on its network, nor do we have an estimate of the total universe of seven-digit dialed ISP Internet traffic. We are confident, however, that Internet usage is growing significantly. As discussed in the response to Question 1, we are currently working on capabilities to identify all ISP Internet usage. There may be, however, methods of which we are currently unaware by which to broadly gauge the overall approximate level of ISP Internet usage by comparing local usage holding time studies, over time, from Separations data. In the meantime, as discussed in the response to Question 1 as more sophisticated switch measurement capabilities are deployed we will update our response.

Question 5. How did SWBT, Pacific Bell, and Nevada Bell determine that interstate usage constitutes more than ten percent of their Internet traffic?

Response: There are at least two bases for determining that well more than ten percent of current ISP Internet usage is interstate. At this time, both bases rely on indirect observations.

First, everything that can be observed about ISP Internet calling and usage (or expected usage), the design of the ISP Internet, services provided by the Internet and the economics of ISP Internet usage, indicate that usage is expected to be or is heavily interstate or international. For instance, advertisements by ISPs and articles about Internet usage (see Attachment 2 for an article regarding AT&T's use of the Internet) indicate that the Internet is/or is expected to be heavily used for interstate and international world-wide web (not local) calling. In a similar vein, the services provided (that can be accessed by telecommunications calls) will generate a large portion of interstate and international (not local) calling.

For instance:

a) Chat lines routinely connect callers (in a manner similar to conference bridges) to other callers from all over the country and the world.

b) E-mail is routinely used to send information to interstate (and international) locations.

c) Web sites and databases are routinely accessed across state and national boundaries.

d) Voice calling over the Internet is largely interexchange and if similar to current interexchange usage patterns, this ISP Internet usage would be heavily interstate.

These are but a few examples of how the Internet readily facilitates, with one or more of these services often being used during a single session, interstate or international calling. During each typical session, the Public Switched Telephone Network (PSTN) connection to the Internet is used continuously for long periods (often over 30 minutes per Internet call).

The design of the Internet involving a distributed, inter-operable packet-switched network in which an Internet user can obtain information from a computer (or talk to another Internet user via a keyboard or voice) in another state or country just as easily as obtaining information from across the state, also encourages heavy interstate and international usage. Finally, the pricing of Internet connections and services by the ISP (largely flat rate), combined with the ability to connect to the Internet via a seven digit dial-up access through the PSTN (without incurring access charges as a result of the FCC exemption from access for ESPs/ISPs and the requirement to connect ISPs through a line side switch connection at a local business rate), have contributed to the phenomenal growth of users connected to the Internet in the last few years and have provided them with an economic incentive to use interstate services (voice and data) which are much less costly, or even viewed by the customer to be free (after paying the ISP's flat rate), when compared to traditional interstate and international telephone or other services in which a fee per minute for service is charged.

The services provided by the Internet, its design and its economics, when compared to traditional services, encourage users to connect for long periods, access multiple services and, consequently, encourage the ISP Internet customer to use the Internet for interstate and international calling for well more than 10% of their ISP Internet usage.

Second, an analysis of Internet backbone usage performed by a CLEC and its ISPs in Texas indicates that well more than 10% of an Internet customer's usage flows over the Internet backbone to interstate and international destinations. Although the study results were incorrectly calculated and presented, these results clearly show that most ISP Internet usage is not local but is predominately interexchange, interstate and international. The study purports to show that only 3% of ISP Internet usage flows over the Internet backbone and that consequently, 97% of the Internet usage allegedly stays within the local calling area. However, to calculate the 3%, Internet backbone packet usage (converted to seconds) was compared to total PSTN usage delivered to the ISP. This calculation effectively compared a continuous stream of packetized operation (without waiting time between packet transmissions which is the human/computer interface time as discussed in Attachment 3) to the total time that the PSTN was in operation. The analysis assumed that all backbone packet waiting time for calls is assigned to local. In other words, when an end user initiates an interstate call to or beyond the Internet, all time (between keystrokes, between words or syllables, etc. or packet waiting time) was not assigned in the CLEC's analyses to the backbone packet usage call, but was defaulted to local. From the standpoint of a typist at a computer keyboard, the method used by the CLEC to calculate the 3% without waiting time roughly means that the end user

would be typing at a rate of 96,000 words per minute. The difference in the 96,000 words per minute and what normally can be expected of a typist is the packet waiting time that the analysis inappropriately defaulted to local. This difference which should be included in the backbone Internet usage, as discussed and illustrated in further in Attachment 3, results from the human/computer interface. If the study properly compared Internet backbone usage including packet waiting time (in other words, the entire time for the end user's call), the percentage of the Internet customers usage, which is transported and terminated beyond the local calling area to interstate and international destinations, is much greater than 3% or 10%.

For these reasons, SWBT has concluded that at least 10% of usage to the Internet is interstate. Detailed analyses of all Internet usage is complicated by:

a) Measurement capabilities to identify total Internet usage;

b) The mixed use nature of Internet usage (i.e., an ISP Internet customer can perform multiple operations, access multiple services at multiple localities all within an Internet session); and,

c) The fact that one carrier (i.e., a LEC such as SWBT) is unable to fully analyze the end-to-end or station-to-station call characteristics.

We are willing to participate in any further FCC analysis and will assist the FCC in any way we can. We do believe however, that if the FCC should undertake further analysis of this issue, it will need to involve not only SWBT and other LECs, but also ISPs as well as CLECs and IXCs who may be connected to ISPs.

Question 6. Is SBC able to determine what share of information-service-provider (ISP) services–that are serving SBC customers–are not located in the same state in which their customers reside? If so, what is the relative share of these out-of-state servers and how is this share identified? Further, what is the share of Internet traffic that is routed to these out-of-state servers and how is that share identified?

Response: Definitive information is not currently available to SBC. It would appear to SBC that the information would only be available from the ISPs. If, as discussed in response to Question 5, the FCC wishes to pursue a broader analysis involving CLECs and ISPs, then this is a question that should be posed to ISPs concerning their Internet customers. As a point of clarification, ISPs are

not serving SBC customers, they are using, like IXCs, SBC telephone company affiliate facilities to originate and transport calls from their customers. The ISP collects the retail revenues for these customers, and like IXCs would have had to (but for the FCC exemption) pay access to LECs and CLECs for use of their facilities to originate and transport ISP customer Internet usage.

Question 7. In SBC's service territory, what share of 1997 Internet traffic was terminated by SBC, by CLECs, and by other Carriers?

Response: Based on the limited measuring capabilities that we were able to deploy in 1997, SBC was able to identify Internet usage originating to CLECs. SBC also provided CLECs with ISP Internet numbers to assist them in identifying Internet usage originated by their end users and sent to SBC. At this point, however, SBC is unable to determine if CLECs are actually identifying this usage, so we are unable to determine what portion of this Internet traffic was delivered to our network. Again, if a broader FCC analysis is contemplated, this is a question that should, appropriately, be directed to ISPs and possibly CLECs.

Question 8. Is any portion of SBC's Internet traffic carried on its packet-switched networks? If so, what were those portions in 1997 for SWBT, Pacific Bell, and Nevada Bell? Also, how were those portions identified?

Response: If this question concerns how many ISPs are using alternate routing to the PSTN, in the time available, we are not able to provide this information. We will investigate this and provide the answer in the near future.

If the question concerns the use by SBC's Internet affiliates of packet switching in its network to route Internet usage, then the answer is yes. They, like other ISPs, use packet-switched networks to route their traffic.

INTERNET RECLASSIFICTION IMPACT ON 1997 INTERSTATE COSTS

ESTIMATED ANNUAL REVENUE REQUIREMENT

($ 000)

	Change in Intrastate*	Change in Interstate
ARKANSAS	(288)	288
KANSAS (Note 1)	---	---
MISSOURI	(311)	311
OKLAHOMA	(2,514)	2,514
TEXAS	(3,078)	3,078
SWBT	(6,191)	6,191
PACIFIC BELL	(29,172)	29,172
NEVADA BELL (Note 1)	---	---

Note 1- Not Currently Available

*Assumes the use of the Interstate rate of return in the calculation.

INTERNET RECLASSIFICTION IMPACT ON 1997 ALLOCATION FACTORS

	Change in Intrastate	Change in Interstate	% Change
SWBT - ARKANSAS			
Local Switching DEM	(0.001783)	0.001783	1.2%
Tandem Switching MOU	(0.004081)	0.004081	1.3%
Exchange Trunk MOU	(0.004350)	0.00435	0.7%
Interexchange Trunk Conv. Minutes	0	0	0%
Interexchange Trunk Conv. Minutes-KMeters	0	0	0%
SWBT - KANSAS (Not Currently Available)			
SWBT - MISSOURI			
Local Switching DEM	(0.000162)	0.000162	0.1%
Tandem Switching MOU	(0.001264)	0.001264	0.5%
Exchange Trunk MOU	(0.000348)	0.000348	0.1%
Interexchange Trunk Conv. Minutes	0	0	0%
Interexchange Trunk Conv. Minutes-KMeters	0	0	0%
SWBT - OKLAHOMA			
Local Switching DEM	(0.009216)	0.009216	6.7%
Tandem Switching MOU	(0.047060)	0.04706	15.2%
Exchange Trunk MOU	(0.009555)	0.009555	1.3%
Interexchange Trunk Conv. Minutes	0	0	0%
Interexchange Trunk Conv. Minutes-KMeters	0	0	0%
SWBT - TEXAS			
Local Switching DEM	(0.001909)	0.001909	1.7%
Tandem Switching MOU	(0.009500)	0.0095	3.5%
Exchange Trunk MOU	(0.004927)	0.004927	1.1%
Interexchange Trunk Conv. Minutes	0	0	0%
Interexchange Trunk Conv. Minutes-KMeters	0	0	0%
PACIFIC BELL			
Local Switching DEM	(0.008981)	0.008981	8%
Tandem Switching MOU	(0.066269)	0.066269	31.4%
Exchange Trunk MOU	(0.035226)	0.035226	9.4%
Interexchange Trunk Conv. Minutes	(0.000621)	0.000621	0.2%
Interexchange Trunk Conv. Minutes-KMeters	(0.000373)	0.000373	0.1%
NEVADA BELL (Not Currently Available)			

(To keep a copy of this page, print it or save it to disk.)

Cheap calls via the Net Internet could revolutionize phone service

By Steve Rosenbush
Tues., Feb. 10, 1998
FINAL EDITION
Section: MONEY
Page 1B

NEW YORK – Almost a year ago, AT&T research chief David Nagle demonstrated an Internet telephone call during a two-day meeting with stock analysts.

He placed the call from a computer, not a telephone. The sound quality was terrible. The delays were annoying.

The story was far different last month when AT&T executives met once again with Wall Street analysts. President John Zeglis showed off a new kind of higher quality, phone-to-phone Internet call. And the demonstration was accompanied by a stunning announcement that AT&T would be the first major U.S. long-distance carrier to jump into the emerging market now known as Internet Protocol (IP) telephony. It is basically a cheaper, more efficient technology that could allow millions of AT&T phone calls to travel via the Internet instead of the regular phone network.

The shift at AT&T is powerful evidence of a remarkable change that has occurred in telecommunications during the past year. Telephone calls over the Internet, dismissed not long ago as a high-tech version of ham radio, are suddenly taken very seriously by the communications establishment.

That raises the prospect of lower prices and new services for consumers and major changes in the structure of the industry now dominated in the USA by AT&T, MCI, Sprint, GTE and the regional Bell phone companies. AT&T's trial begins during the second quarter. Qwest Communications and a few other carriers already allow people to make calls over the Internet for 5 cents to 7.5 cents a minute.

By 2002, the Internet could account for 11% of U.S. and international long-distance voice traffic, up from just 0.2% last year, predicts analyst Mark Winther of International Data Corp. "Internet telephony is a reality, and telcos have surprisingly awakened to that rather early," analyst David Goodtree of Forrester Research says. "It will be the catalyst that forces the total restructuring of the profits of all telcos worldwide."

Perhaps this forecast was the wakeup call: IP telephony could eliminate the profits of U.S. long-distance carriers by stealing just 6% of U.S. telephone traffic, the International Telecommunications Union warned in a report last year.

Evidence of the hastening convergence of the phone network and the Internet is overwhelming.

The same day that AT&T announced its Internet telephone plans, MCI revealed a pact with Netspeak, a company that makes computers that connect phone networks to the Internet. Bell Atlantic announced a day later that it wants to build high-speed Internet transmission lines across its local phone territory. US West announced the following day that it was forming an Internet-development alliance with equipment maker Cisco Systems.

America Online, the country's largest on-line service, is testing IP telephone service with 5,000 users. Tele-Communications Inc., the country's largest cable TV operator, said in December that it would begin offering Internet phone service in late 1999. Last month, start-up Level 3 said it would build the nation's first telephone network based entirely on Internet standards.

"Over the next few years, you will see very rapid growth in IP telephony," says Joe Nacchio, CEO of Qwest, which is constructing a 16,000-mile fiber network that uses both traditional phone switching technology and the Internet. "I think it will be unstoppable." He already offers consumers IP telephony in nine Western cities.

Humble beginnings

Internet telephony barely existed until February 1995, when an Israeli company, VocalTec, introduced a software program that allowed people to speak to each other using their PCs and a microphone.

"It was like ham radio," recalls analyst Francois de Repentigny of Frost & Sullivan, an early user. People could only talk to other personal computer users who ran the same software and happened to be logged onto the Internet at the same time.

The medium took a huge step forward in 1996, when VocalTec unveiled a "gateway" computer that connects the Internet to the phone network. That allowed people to speak to each other over the Net using regular phones instead of PCs.

The advance was a major break with tradition. The basic design of the phone network hasn't changed since AT&T invented it more than 100 years ago. It's a vast roadway where every call has its own lane, or circuit. A telephone call ties up an entire circuit, even when people pause between words or put the phone down to answer the doorbell. The Internet is much more efficient. Calls travel a short distance over copper phone lines to the nearest phone company office, where a gateway computer converts the sound of the voice into the ones and zeros of computer language and breaks it into little pieces known as packets. Compressed packets are thrust into the Internet or data network, where they share lines with other transmissions, such as e-mail.

The result is that Internet calls are cheaper than regular calls. "This is going to be the stake that finally drives a hole through the heart of the ... extraneous costs associated with traditional voice communications," says Jim Courter, president of IDT, which charges 5 cents a minute for long-distance calls over the Internet. "The cost of calls is going to be dramatically reduced."

IP calls are especially cheap now, because they are exempt from fees long-distance carriers must pay local carriers for access to the local networks, where all long-distance calls begin and end. Local carriers want that to change, but IP technology would still be more efficient than a regular long-distance call.

Cable TV companies and Internet service providers entering the $80 billion long-distance business are sure to benefit. By 2002, the Internet will drain $3 billion in annual revenue from U.S. long-distance carriers, Forrester Research estimates. That's about 4% of their revenue base. About $2 billion of that will go to new long-distance providers, and about $1 billion will go directly to telephone users in the form of price cuts.

Profitable niches

Others, too, will benefit as IP phone service takes hold.

- Up to 10% of the world's fax market, which generates $45 billion in telecom revenue a year, will move to the Internet in two or three years, says CEO David Friend of FaxNet, a long-distance carrier just for faxes.
- "The $18 billion market for calls from the United States to foreign destinations will be the first and biggest target of Internet telephony," Forrester says. Key

reason: The Internet bypasses international telephone networks, which are often outrageously expensive. USA Global Link announced plans in early 1997 to build an IP-based network just for international calls.

- A company can easily slash its phone budget 35% by moving its voice traffic to the same network that handles its data transmissions, says Eric Benhamou, CEO of Internet equipment maker 3Com. A Forrester survey of 52 *Fortune* 1000 companies finds that more than 40% of telecom managers plan to move some voice or fax traffic to the Internet by 1999.

One major force driving the rapid growth of the Internet phone business is that the basic technology behind the Internet is available to the public for free. But today's Internet has drawbacks, too. It is dogged by traffic jams that can occur during peak usage. Even users with high-speed access can get bogged down when the network is overloaded. Newer versions of the Net will be able to assign higher priority to certain kinds of transmissions, such as phone calls.

AT&T's Nagle serves on a presidential advisory committee that is guiding the development of Internet 2, a high-speed network that will be available in several years.

Meanwhile, he says the quality and security of IP telephony on the existing Internet is rising. The implications of that are just reaching consumers.

Bruce Ravenel, TCI's senior vice president for telecommunications, says TCI's 12 million customers won't be able to tell the difference between a regular phone call and an IP call. "The technology inside the network will be IP, but the experience for the customer is that they will make a 'toll' quality phone call, just like they do today with conventional telephone networks."

John Roth, CEO of equipment maker Northern Telecom, goes even further. He sees the day when voice calls will be virtually free and video and data transmission will be the real moneymaker.

Who will dominate?

Newcomers might have an edge in the market to provide this new breed of phone service. "Give me one example of any company in any industry that has managed to deal with an economic change of this magnitude and be dominant in the next era," says James Crowe, CEO of Level 3. "There isn't one."

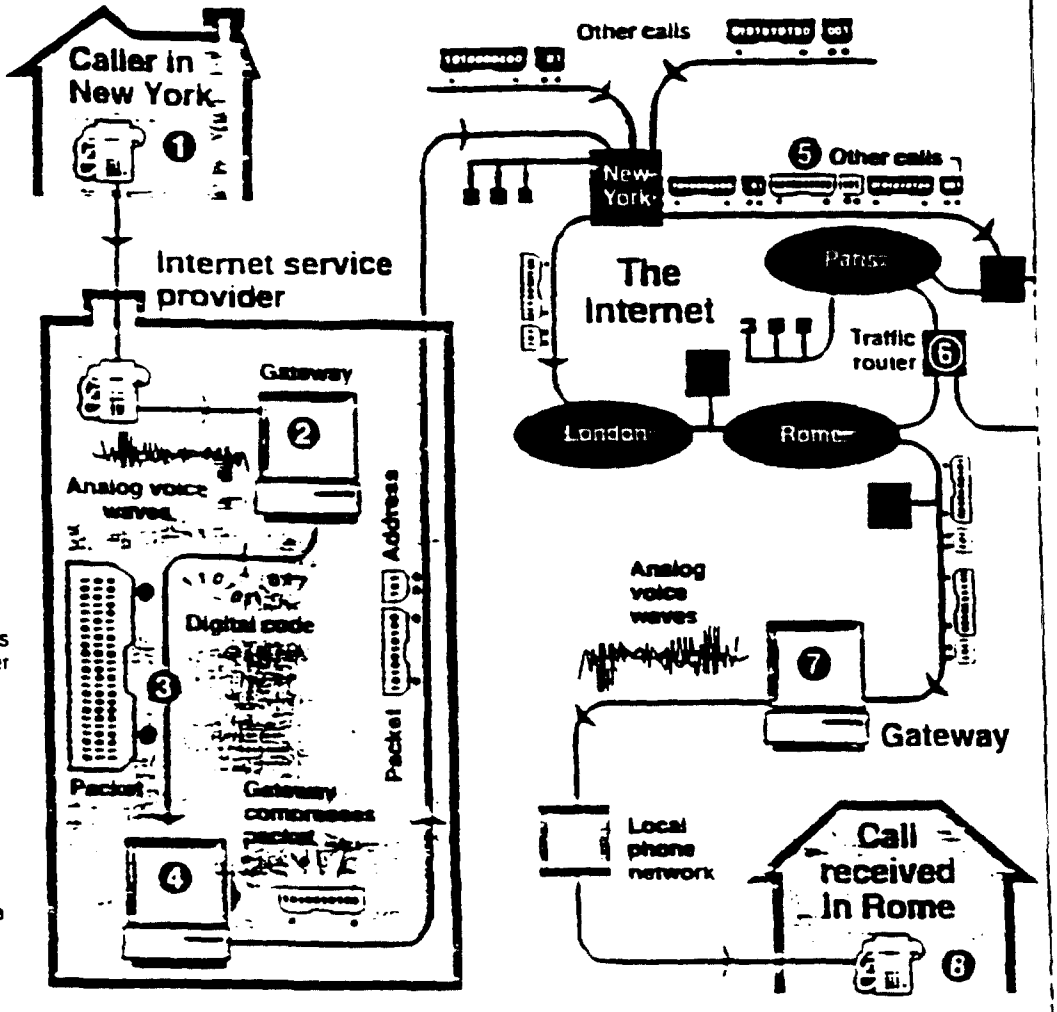
Even old-line phone carriers that develop a good strategy for IP telephony might run into trouble, because they will need to take huge charges to write off their old networks, says Francis McInerney, partner with North River Ventures, an investment and consulting group.

But Nagle says big phone companies already have paid off many of their network investments. And new data networks will lower costs for traditional carriers, so profit margins won't be gutted by falling prices. Finally, he notes, history shows that traffic on communications networks rises as prices fall.

Nagle says the fact that AT&T has been able to create an Internet phone offering between 1997 and 1998 is proof that it can compete.

"The industry is moving more quickly. And more important for us, we're moving a lot more quickly," he says. "We have realized the potential and importance of the Internet, and we are resolved to be leaders in that industry."

How phone calls are made over the Internet



1 The caller

The caller dials a toll-free number and an ID number that connects him or her to a gateway computer, a bridge between the regular phone network and the Internet. The caller then dials the number of the party in Rome. The call travels the phone network until it gets to the gateway

2 The gateway

The gateway digitizes the caller's voice, turning it into the ones and zeros of computer language

3 Digitization

The gateway breaks the digitized voice into pieces known as packets. A typical packet includes 10 to 30 milliseconds worth of conversation. Each packet is coded with the second party's phone number, just as a letter is put in an envelope with an address.

4 Compression

The gateway compresses the digitized packets.

5 Transmission

The gateway thrusts the compressed packets into the Internet, where they share wires with other data transmissions

6 Routers

The packets travel the Internet, passing through routers, computers that read the addresses on each packet and assign them transmission lines

7 Back to analog

The packets finally arrive at a gateway that decompresses them and converts the digital signal back to analog

8 Connection

The gateway transfers the call to the local phone network, which delivers it to the intended party.

By Dave Marsh, USA TODAY

Illustration of Proper Jurisdictional Assignment of Internet Call Usage

The following illustration assumes a customer accesses his Internet Service Provider (ISP) using a dial up 33.3 kbs modem and the loop from the customer's premise to his local dial serving office has a normal 56,000 kbs capacity. The following two examples illustrate the proper jurisdictional separations treatment of the PSTN usage at the customer's local dial office.

Example 1: Customer dials up ISP and accesses an Internet server in another state. He then begins entering data at his PC keyboard.

Rate of entering information:

75	words per minute entered from keyboard
x 5	characters per word, average
375	characters per minute
x 8	bits per character
3000	bits per minute
÷ 60	seconds per minute
50	bits per second entered

If customer keys data for 10 minutes, he would send 30,000 bits of data. He would use only 0.09% (30,000 bits/33.6Mbits) of his loop transmission capacity, or the equivalent of 0.01 minutes of transmission capacity, but his serving end office switch would be in use for the entire 10 minutes. This difference results from the human/computer interface. In other words, the network waiting time resulting from the inability of the end user to originate and send data at the speed which the LEC's PSTN, or the ISP's packet switched network can accommodate and transport. This human/computer interface time is still part of the call usage and, as a result, the local dial switch would properly measure 10 minutes of interstate usage. It would **not** be appropriate to say that you only talked for 0.09% of the 10 minutes, so only 0.09% of the usage is interstate and 99.01% is intrastate.

Example 2: Customer dials up her ISP and selects a website in another state. She then sends a data file from her PC to the website and then stays on line for a total of 10 minutes.

Rate of entering information:

1,000,000	bits of data in the transmitted file
÷ 33,300	bits per second modem transmission
30	seconds to transmit file of data

For the 10 minutes that customer is connected to the ISP, she would have used 3% (1Mbits/33.6Mbits) of her transmission capacity; however, since the customers' serving end office switch would be in use for the entire 10 minutes, there would properly be 10 minutes of interstate usage. As in Example 1, due to the human/computer interface element, as mentioned above, it would **not** be appropriate to assign 3% of the 10 minutes to interstate and 97% to intrastate.